(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 990 609 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
05.04.2000 Bulletin 2000/14

(51) Int. Cl.[7]: **B65H 3/12**, B65H 1/02

(21) Application number: **99106495.7**

(22) Date of filing: **30.03.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **02.10.1998 JP 28137298**

(71) Applicant: **NEC CORPORATION**
Tokyo (JP)

(72) Inventors:
- **Tomiyama, Katsuya**
  Minato-ku, Tokyo (JP)
- **Nakabayashi, Isamu**
  Minato-ku, Tokyo (JP)

(74) Representative: **Betten & Resch**
Reichenbachstrasse 19
80469 München (DE)

(54) Sheet feeding apparatus

(57) A sheet feeding apparatus includes a carrier portion, a suction belt, a servo motor, a blower, a solenoid valve, a pressure sensor, a position sensor, a belt hole sensor, and a controller. The carrier portion feeds a plurality of sheets of different sizes in a direction of their thickness in an upright state. The suction belt has a belt hole for drawing each sheet fed from the carrier portion by suction, so as to feed out each sheet drawn by suction with the belt hole. The servo motor drives the suction belt. The blower generates a pressure for drawing the sheet by suction in the belt hole. The solenoid valve enables/disconnects supply of the negative pressure from the blower to the belt hole. The pressure sensor measures a pressure in the belt hole. The position sensor detects the sheet fed out by the suction belt. The belt hole sensor detects the belt hole after the sheet is fed out. The controller controls operations of the solenoid valve and the servo motor on the basis of detection outputs from the pressure sensor, the position sensor, and the belt hole sensor.

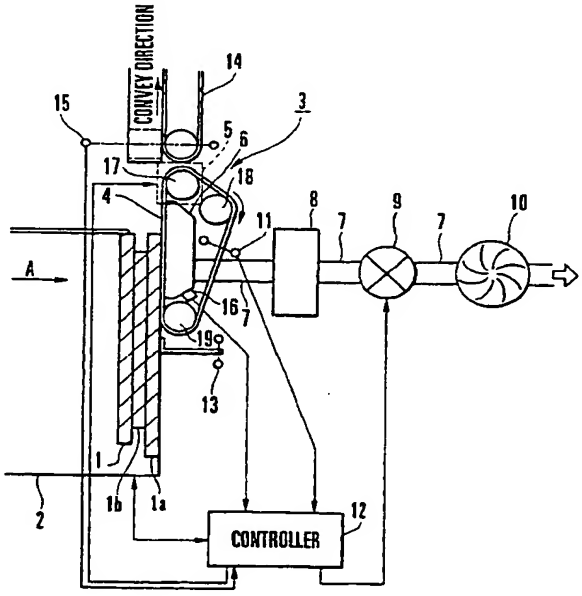


FIG. 1

EP 0 990 609 A2

Description

Background of the Invention

[0001] The present invention relates to a sheet feeding apparatus and, more particularly, to a sheet feeding apparatus for feeding out mail items having different sizes, weights, and shapes one by one.

[0002] As an example of a conventional sheet feeding apparatus, a sheet extracting apparatus described in Japanese Patent Laid-Open No. 6-71227 (Reference 1) is known.

[0003] Reference 1 describes a technique for extracting sheets by utilizing the negative pressure of a negative pressure chamber. Reference 1 also describes a technique for measuring the pressure in the negative pressure chamber with a pressure sensor and informing an abnormality when the value of the pressure sensor becomes less than a predetermined value, and a technique for blocking the flow of air to the negative pressure chamber with a relief valve connected to the negative pressure chamber, when no mail exists, to decrease noise.

[0004] Fig. 4 shows the schematic arrangement of the conventional sheet extracting apparatus described in Reference 1. The sheet extracting apparatus shown in Fig. 4 comprises a suction belt 60 for supplying a mail item 58, a negative pressure chamber 62 close to the suction belt 60 to receive a negative pressure, an air pipe 64 connected to the negative pressure chamber 62, a relief valve 66 for controlling the negative pressure of the negative pressure chamber 62, an air filter 68 for removing dust and the like in the air, and a blower 70 for generating a negative pressure.

[0005] A pressure sensor 72 for detecting the pressure is placed in the negative pressure chamber 62, and a mail sensor 74 for detecting the presence/absence of a mail item is placed at a position where the mail item 58 is placed. Outputs from the sensors 72 and 74 are input to a CPU (Central Processing Unit) 76 having an air pressure determining section 76a. The CPU 76 is connected to a valve controller 78 for controlling the relief valve 66, and a display 82 and a voice guide 84 that constitute an informing unit 80 for informing the operator of the state of the apparatus.

[0006] The operation of the sheet extracting apparatus having the above arrangement will be described.

[0007] Usually, the mail items 58 are drawn by the suction belt 60 with the negative pressure of the negative pressure chamber 62 one by one, and each mail item is fed by the suction belt 60 in the convey direction. With a lapse of a predetermined period of time since the start of operation of the apparatus, if the mail sensor 74 determines that no mail item 58 has been fed to the suction belt 60 for a predetermined period of time or more, the CPU 76 controls the valve controller 78 to diagnose the apparatus by utilizing the idling time during which no mail item is fed. Thus, the relief valve 66 is closed to set the interior of the negative pressure chamber 62 at a negative pressure.

[0008] The state in the negative pressure chamber 62 is detected by the pressure sensor 72. The CPU 76 compares the detected pressure and a normal-state pressure with the air pressure determining section 76a. The CPU 76 determines whether the comparison result is less than a predetermined value. If the comparison result is less than a predetermined value, the CPU 76 drives the display 82 and voice guide 84 of the informing unit 80 to inform the operator of an abnormality.

[0009] From the detection result of the mail sensor 74, if no mail item 58 is placed in front of the suction belt 60, the relief valve 66 is switched to an open state to release the pressure, so the interior of the negative pressure chamber 62 does not become a negative pressure. This aims at preventing the interior of the negative pressure chamber 62 from becoming a negative pressure to generate air suction noise.

[0010] In the conventional sheet extracting apparatus described above, when sheets such as mail items having largely different sizes, weights, and shapes are to be extracted by suction one by one, sometimes a particularly heavy mail item is not reliably drawn by suction with the rotating suction belt 60. In this case, the suction belt 60 performs idling and does not feed a mail item, or a mail item is conveyed while slipping on the suction belt 60. Then, an interval cannot be maintained between the currently fed mail item and a mail item which is to be extracted next.

[0011] This is because, when feeding the mail, the suction belt 60 is continuously rotated at a constant speed without stopping. Another reason is as follows. The pressure in the negative pressure chamber 62 is measured by the pressure sensor 72. If the measurement result is less than a predetermined value, it is utilized for only informing the operator of the abnormality of the suction portion including the negative pressure chamber.

[0012] In the conventional sheet extracting apparatus described above, when one mail item is extracted and thereafter the next mail item is to be extracted, the next mail item is sometimes fed at an earlier timing than usual. In this case, the next mail item overlaps the current one to be conveyed together with it.

[0013] This is due to the following reason. Since the relief valve 66 is not turned on/off every time one mail item is fed, the interior of the negative pressure chamber 62 is always at a negative pressure, and accordingly a force for drawing the mail item by suction is always effected.

Summary of the Invention

[0014] It is an object of the present invention to provide a sheet feeding apparatus in which, when feeding sheets having largely different sizes, weights, and shapes, the sheets can be drawn with a suction belt reli-

ably, and can be stably fed one by one.

[0015] It is another object of the present invention to provide a sheet feeding apparatus in which a sheet is prevented from being fed at an earlier timing than usual, thereby preventing double feeding.

[0016] In order to achieve the above objects, according to the present invention, there is provided a sheet feeding apparatus comprising a sheet feed portion for feeding a plurality of sheets of different sizes in a direction of thickness thereof in an upright state, a suction belt having a belt hole for drawing each sheet fed from each sheet feed portion by suction, so as to feed out the sheet drawn by suction with the belt hole, drive means for driving the suction belt, negative pressure generating means for generating a pressure for drawing the sheet by suction in the belt hole, opening/closing means for applying/stopping applying the negative pressure from the negative pressure generating means to the belt hole, a pressure sensor for measuring a pressure in the belt hole, a first detection sensor for detecting the sheet fed out by the suction belt, a second detection sensor for detecting the belt hole after the sheet is fed out, and control means for controlling operations of the opening/closing means and the drive means on the basis of detection outputs from the pressure sensor and the first and second detection sensors.

Brief Description of the Drawings

[0017]

Fig. 1 is a view showing the schematic arrangement of a sheet feeding apparatus according to an embodiment of the present invention;

Fig. 2 is an enlarged view of the main part of the sheet feeding apparatus of Fig. 1 seen from a direction A;

Figs. 3A to 3E are timing charts indicting the sheet extracting operation of the sheet feeding apparatus of Fig. 1; and

Fig. 4 is a view showing the schematic arrangement of a conventional sheet extracting apparatus.

Description of the Preferred Embodiment

[0018] The preferred embodiment of the present invention will be described with reference to the accompanying drawings.

[0019] Fig. 1 shows a sheet feeding apparatus according to an embodiment of the present invention.

[0020] Referring to Fig. 1, sheets 1 are placed on a carrier portion 2 in an upright state. The carrier portion 2 serves as a sheet feed portion to push the sheets 1 in a direction of their thickness with a pushing means (not shown), thereby feeding them to a sheet extracting portion 3. A sheet sensor 13 for detecting the presence/absence of the sheet is arranged near the sheet extracting portion 3 to be flush with it. The sheet extracting portion 3 sequentially feeds an uppermost sheet 1a detected by the sheet sensor 13.

[0021] The sheet extracting portion 3 is constituted by a wide, endless suction belt 4, a servo motor 5, a negative pressure chamber 6, a belt hole sensor 11, and a pressure sensor 16. The suction belt 4 is formed with a plurality of rows of a plurality of belt holes 4a (Fig. 2) at a predetermined pitch in the longitudinal direction. The servo motor 5 drives the suction belt 4 through a drive roller 17. The negative pressure chamber 6 draws the sheet 1 by suction through the belt holes 4a of the suction belt 4. The belt hole sensor 11 detects the positions of the belt holes 4a in order to stop them at predetermined positions. The pressure sensor 16 detects the pressure in the negative pressure chamber 6.

[0022] In this embodiment, the two pairs of belt holes 4a formed in the widthwise direction of the suction belt 4 are arranged equidistantly in the longitudinal direction of the suction belt 4. Hence, when the belt holes 4a of one pair are detected and the suction belt 4 is stopped, the belt holes 4a of the other pair are stopped at the suction position of the sheet 1. The suction belt 4 is kept taut between driven rollers 18 and 19.

[0023] A blower 10 is connected to the negative pressure chamber 6 through an air hose 7 to generate a negative pressure in it. An air filter 8 is connected between the negative pressure chamber 6 and blower 10 to remove dust in air drawn by the negative pressure chamber 6. A solenoid valve 9 is connected between the air filter 8 and blower 10 to control the negative pressure in the negative pressure chamber 6.

[0024] Signals from the belt hole sensor 11, a position sensor 15, and pressure sensor 16 are output to a controller 12. The controller 12 controls the servo motor 5 and solenoid valve 9 on the basis of these sensor outputs.

[0025] A convey unit 14 for conveying the sheet 1 by supporting its bottom and side surfaces is arranged on a downstream side, in the convey direction, of the sheet extracting portion 3. The convey unit 14 conveys each separated sheet downstream. The position sensor 15 for detecting the leading end of the sheet 1 is arranged at the inlet of the convey unit 14.

[0026] The operation of the sheet feeding apparatus having the above arrangement will be described with reference to Figs. 2 and 3. Fig. 2 shows the main part of the apparatus in enlargement from the direction of arrow A in Fig. 1. Figs. 3A to 3E are timing charts showing the sheet extracting operation.

[0027] The sheet 1 placed on the conveyor portion 2 is fed toward the sheet extracting portion 3. When the sheet 1 is detected by the sheet sensor 13, the pushing operation is stopped. At this time, the belt holes 4a of the suction belt 4 are stopped at the positions shown in Fig. 2. Since the solenoid valve 9 is ON to generate a negative pressure in the negative pressure chamber 6, the uppermost sheet 1a is drawn by suction with the suction belt 4. When the sheet 1a is drawn by suction

and the pressure in the negative pressure chamber 6 becomes a predetermined value or more, an ON signal is output from the pressure sensor 16 to enable the feedout operation of the sheet.

[0028] This state corresponds to time t0 of Figs. 3A to 3E, where the solenoid valve 9 is ON (Fig. 3D), the output from the pressure sensor 16 is ON (Fig. 3C), and the sheet 1a is drawn by suction with the suction belt 4.

[0029] After that, at time t1, the controller 12 turns on the servo motor 5 to drive the suction belt 4 (Fig. 3A). Thus, the feedout operation of the sheet 1a drawn by suction with the suction belt 4 toward the convey unit 14 is started.

[0030] When the feed operation of the sheet 1 by the carrier portion 2 is delayed, the sheet 1a is not sufficiently drawn by suction with the suction belt 4, and the pressure in the negative pressure chamber 6 becomes lower than the predetermined value. The pressure sensor 16 does not output an ON signal, and even at time t1, the servo motor 5 is not turned on, so the feedout operation of the sheet 1a is not started. After the sheet 1a is sufficiently drawn by suction with the suction belt 4, the pressure in the negative pressure chamber 6 becomes the predetermined value or more, and the pressure sensor 16 outputs an ON signal, then the servo motor 5 is turned on to start the feedout operation of the sheet 1a.

[0031] After the feedout operation of the sheet 1a is started, at time t2, the position sensor 15 detects that the leading end of the sheet 1a has reached the convey unit 14 (Fig. 3E). When the position sensor 15 outputs a detection signal, the controller 12 turns off the solenoid valve 9 (Fig. 3D). The interior of the negative pressure chamber 6 is restored to the atmospheric pressure, and the sheet 1a released from the suction belt 4 is transferred to the convey unit 14 and is conveyed by it.

[0032] After the sheet 1a is fed out, at time t3, the belt hole sensor 11 detects the belt holes 4a of the suction belt 4 (Fig. 3B). When the belt hole sensor 11 outputs a detection signal, the controller 12 stops driving the suction belt 4 (Fig. 3A). The belt holes 4a of the other pair are thus stopped at positions where they are in contact with the sheet 1 shown in Fig. 2. Simultaneously, the controller 12 turns on the solenoid valve 9 (Fig. 3D), and a next sheet 1b fed by the carrier portion 2 is drawn by suction with the suction belt 4.

[0033] After that, at time t4 at a lapse of a time T (sec) since the servo motor 5 is turned on, the controller 12 checks whether the pressure sensor 16 outputs an ON signal. If YES, the controller 12 determines that the next sheet 1b is drawn by suction with the suction belt 4, and turns on the servo motor 5 again. Therefore, the suction belt 4 is driven to start the feedout operation of the next sheet 1b. In this manner, the sheets are sequentially fed out at an interval of time T (sec).

[0034] The minimum period T of the ON/OFF timing of the servo motor 5 can be set before starting the apparatus. Accordingly, the value of the period T can be changed.

[0035] In the above embodiment, the belt holes 4a are arranged in two pairs in the longitudinal direction of the suction belt 4. However, if the belt holes 4a can be stopped at positions where they are in contact with the sheet 1, they may be arranged in one pair, three pairs, or more. When one pair of belt holes 4a are provided, they can be stopped at positions where they are in contact with the sheet 1, by feeding the suction belt 4 by a predetermined amount after they are detected. It suffices if at least one or more belt holes 4a are formed in the widthwise direction of the suction belt 4.

[0036] As has been described above, according to the present invention, when the sheet is fed, the suction belt is stopped temporarily, so that the sheet can be reliably drawn by suction with the suction belt. At the start of the feed operation of the sheet, if the value of the pressure sensor that detects the pressure in the negative pressure chamber is less than a predetermined value, the suction belt is not rotated. The suction belt is rotated when the value of the pressure sensor reaches a predetermined value or more. Therefore, slipping between the suction belt and the sheet, which occurs when suction is insufficient, is decreased, and a short sheet-feed interval or double feeding can be prevented.

[0037] After it is detected that each sheet which is fed one by one is transferred to the downstream convey unit and before the suction belt is temporarily stopped to draw the next sheet by suction, the solenoid valve is turned off to restore the interior of the negative pressure chamber to the atmospheric pressure. This prevents the next sheet from being fed at an earlier timing than usual, thus preventing a short feed interval or double feeding.

Claims

1. A sheet feeding apparatus characterized by comprising:

a sheet feed portion (2) for feeding a plurality of sheets (1) of different sizes in a direction of thickness thereof in an upright state;
a suction belt (4) having a belt hole (4a) for drawing each sheet fed from said sheet feed portion by suction, so as to feed out each sheet drawn by suction with the belt hole;
drive means (5) for driving said suction belt;
negative pressure generating means (10) for generating a pressure for drawing the sheet by suction in the belt hole;
opening/closing means (9) for applying/stopping applying the negative pressure from said negative pressure generating means to the belt hole;
a pressure sensor (16) for measuring a pressure in the belt hole;
a first detection sensor (15) for detecting the sheet fed out by said suction belt;

a second detection sensor (11) for detecting the belt hole after the sheet is fed out; and

control means (12) for controlling operations of said opening/closing means and said drive means on the basis of detection outputs from said pressure sensor and said first and second detection sensors.

2. An apparatus according to claim 1, wherein said control means sets the pressure in the belt hole to a negative pressure while said suction belt is stopped, to draw by suction the sheet fed from said sheet feed portion and, when the negative pressure in the belt hole detected by said pressure sensor, after the sheet is drawn by suction, is not less than a predetermined value, starts to drive said suction belt.

3. An apparatus according to claim 2 wherein, when the negative pressure in the belt hole detected by said pressure sensor after the sheet is drawn by suction is less than the predetermined value, said control means does not drive said suction belt but let said suction belt at a stopped state.

4. An apparatus according to claim 1 wherein, when the sheet fed out by said suction belt is detected by said first detection sensor, said control means closes said opening/closing means to restore the pressure in the belt hole to an atmospheric pressure.

5. An apparatus according to claim 1 wherein, when the belt hole is detected by said second detection sensor while said suction belt is driven, said control means stops said suction belt at a position where the belt hole is in contact with the sheet, and opens/closes said opening/closing means while said suction belt is stopped, to generate a negative pressure in the belt hole, thereby drawing a next sheet by suction with said suction belt.

6. An apparatus according to claim 1 wherein, after a period T during which said suction belt is started to drive and thereafter started to drive next elapses, when the negative pressure in the belt hole detected by said pressure sensor is not less than a predetermined value, said control means starts to drive said suction belt.

7. An apparatus according to claim 6, wherein said control means controls said suction belt at a stop state when the negative pressure in the belt hole detected by said pressure sensor is less than the predetermined value, and starts to drive said suction belt when the negative pressure in the belt hole detected by said pressure sensor is not less than the predetermined value.

8. An apparatus according to claim 6, wherein the period T during which said suction belt is started to drive can be changed.

9. An apparatus according to claim 1, wherein

the belt hole comprises a plurality of belt holes formed at a predetermined interval in a longitudinal direction of said suction belt, and

when one of the belt holes is detected by said second detection sensor, another one of the belt holes is stopped at a sheet suction position.

10. An apparatus according to claim 1, wherein

said apparatus further comprises a convey unit (14) arranged on a downstream side, in a convey direction, of said suction belt to constantly convey a fed sheet in the convey direction, and said first detection sensor is arranged at an inlet of said convey unit.

11. An apparatus according to claim 1, wherein

said apparatus further comprises a negative pressure chamber (6) provided inside said suction belt to communicate with the belt hole, and said pressure sensor measures the pressure in said negative pressure sensor.

12. An apparatus according to claim 11, wherein said suction belt, said drive means, said pressure sensor, said second detection sensor, and said negative pressure sensor constitute a sheet extracting portion (3).

13. An apparatus according to claim 1, wherein

said drive means comprises a servo motor,

said negative pressure generating means comprises a blower, and

said opening/closing means comprises a solenoid valve arranged in an air path (7) between said blower and the belt hole.

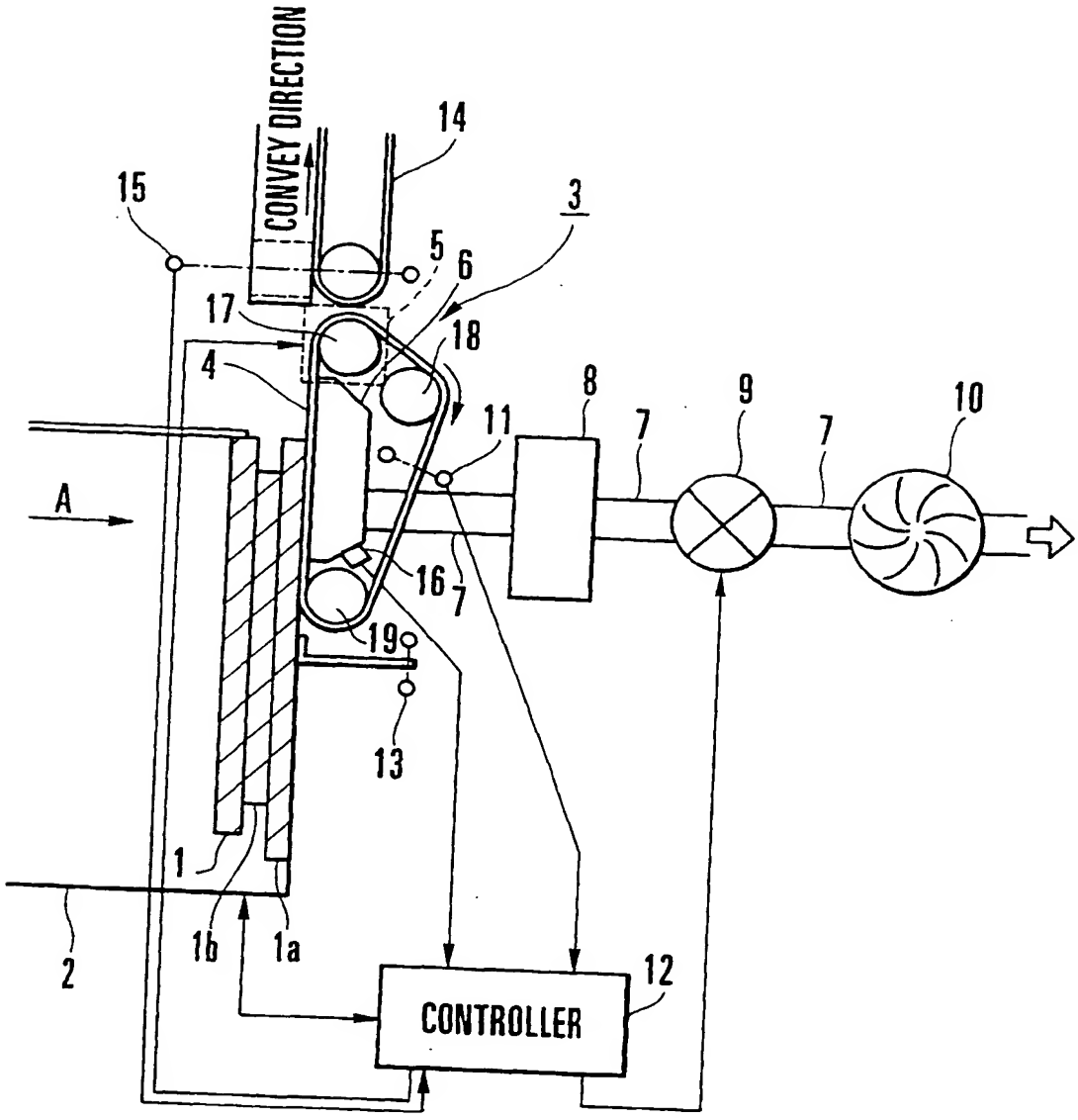


FIG. 1

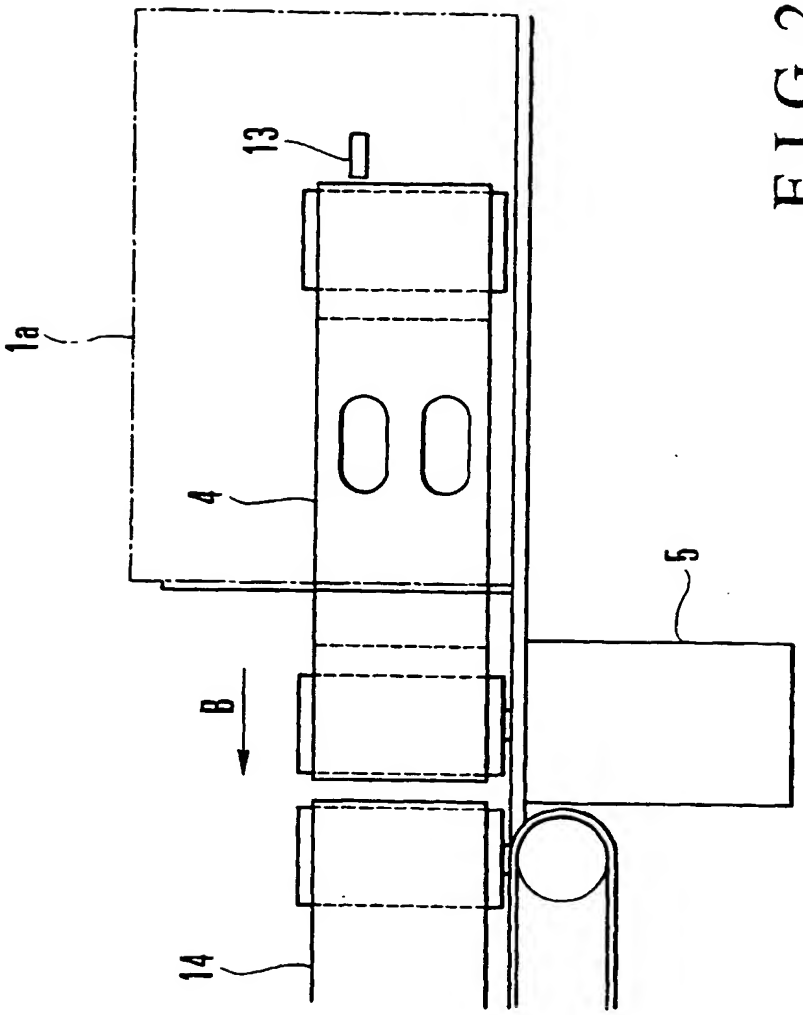


FIG.2

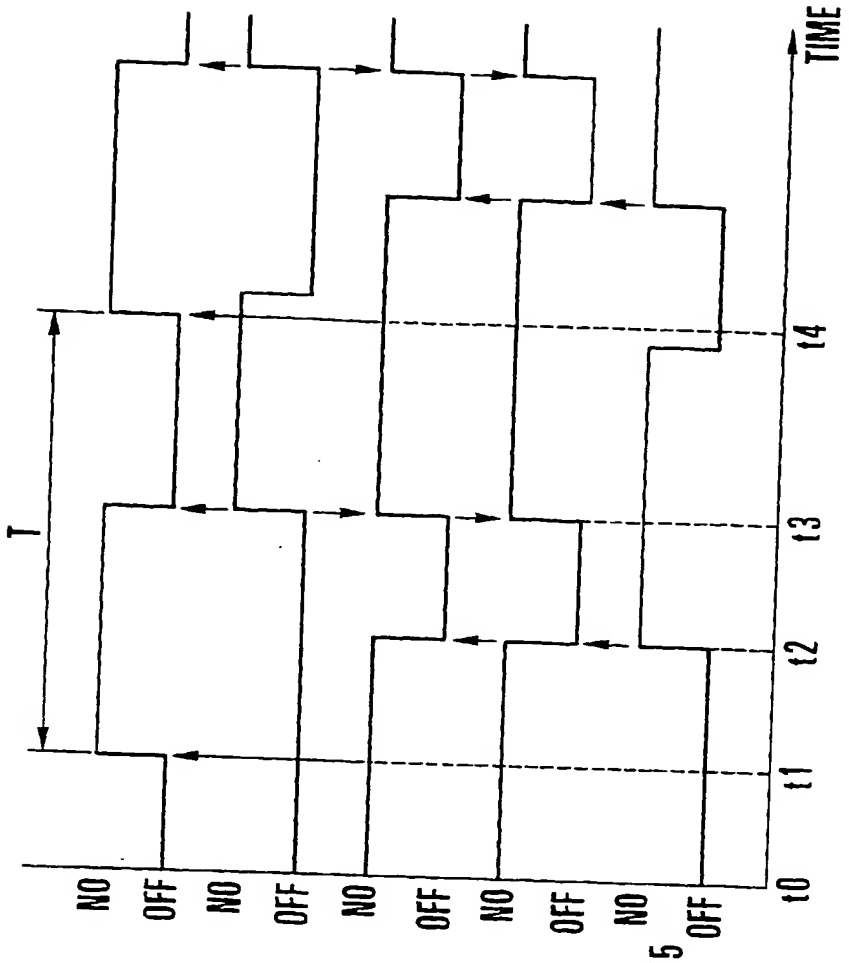


FIG. 3A SERVO MOTOR 5

FIG. 3B BELT HOLE SENSOR 11

FIG. 3C PRESSURE SENSOR 16

FIG. 3D SOLENOID VALVE 9

FIG. 3E SEET POSITION SENSOR 15

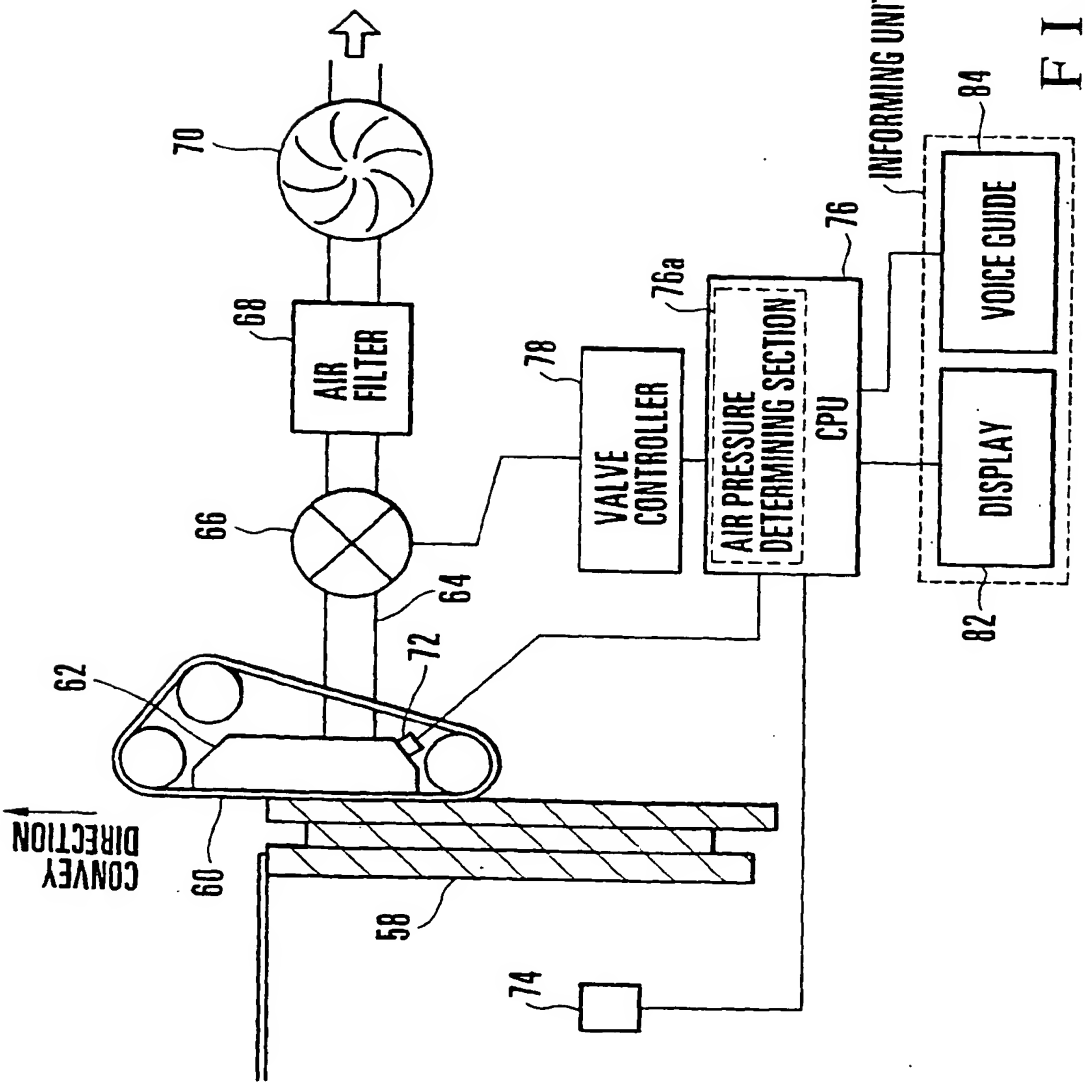


FIG. 4
PRIOR ART

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 990 609 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
27.12.2000 Bulletin 2000/52

(43) Date of publication A2:
05.04.2000 Bulletin 2000/14

(51) Int. Cl.[7]: **B65H 3/12**, B65H 1/02

(21) Application number: **99106495.7**

(22) Date of filing: **30.03.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **02.10.1998 JP 28137298**

(71) Applicant: **NEC CORPORATION**
Tokyo (JP)

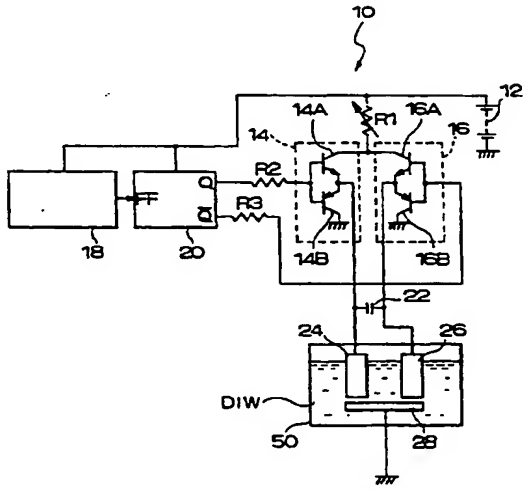
(72) Inventors:
- **Tomiyama, Katsuya**
  Minato-ku, Tokyo (JP)
- **Nakabayashi, Isamu**
  Minato-ku, Tokyo (JP)

(74) Representative: **Betten & Resch**
Reichenbachstrasse 19
80469 München (DE)

(54) Sheet feeding apparatus

(57) A sheet feeding apparatus includes a carrier portion, a suction belt, a servo motor, a blower, a solenoid valve, a pressure sensor, a position sensor, a belt hole sensor, and a controller. The carrier portion feeds a plurality of sheets of different sizes in a direction of their thickness in an upright state. The suction belt has a belt hole for drawing each sheet fed from the carrier portion by suction, so as to feed out each sheet drawn by suction with the belt hole. The servo motor drives the suction belt. The blower generates a pressure for drawing the sheet by suction in the belt hole. The solenoid valve enables/disconnects supply of the negative pressure from the blower to the belt hole. The pressure sensor measures a pressure in the belt hole. The position sensor detects the sheet fed out by the suction belt. The belt hole sensor detects the belt hole after the sheet is fed out. The controller controls operations of the solenoid valve and the servo motor on the basis of detection outputs from the pressure sensor, the position sensor, and the belt hole sensor.

FIG. 1



EP 0 990 609 A3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 10 6495

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	US 3 599 967 A (RAPPARLIE HANS ET AL) 17 August 1971 (1971-08-17) * column 2, line 35 - column 3, line 43 * * column 6, line 25 - line 32 * * figure 1 *	1,5,9-12	B65H3/12 B65H1/02
D,Y	PATENT ABSTRACTS OF JAPAN vol. 018, no. 322 (C-1214), 20 June 1994 (1994-06-20) & JP 06 071227 A (TOSHIBA CORP), 15 March 1994 (1994-03-15) * abstract *	1,5,9-12	
A	US 5 391 051 A (SABATIER LOUIS ET AL) 21 February 1995 (1995-02-21) * column 2, line 37 - line 42 * * column 3, line 46 - column 4, line 45 * * figure 1 *	1,5,9-12	
A	US 4 018 434 A (MITCHELL THOMAS J ET AL) 19 April 1977 (1977-04-19) * column 1, line 54 - column 2, line 10 * * column 3, line 1 - line 52 * * figures 1,2 *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B65H B07C
A	EP 0 333 171 A (SIEMENS NIXDORF INF SYST) 20 September 1989 (1989-09-20) * column 5, line 4 - column 10, line 16 * * figures 1-3 *	1	
A	US 4 030 723 A (IRVINE ROBERT ET AL) 21 June 1977 (1977-06-21) * column 1, line 56 - column 3, line 32 *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	31 October 2000	Pussemier, B

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 10 6495

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

31-10-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3599967 A	17-08-1971	DE 1817101 A	16-07-1970
JP 06071227 A	15-03-1994	NONE	
US 5391051 A	21-02-1995	FR 2696163 A	01-04-1994
		CA 2106906 A	26-03-1994
		DE 69311042 D	03-07-1997
		DE 69311042 T	04-09-1997
		EP 0589789 A	30-03-1994
US 4018434 A	19-04-1977	NONE	
EP 0333171 A	20-09-1989	DE 3808669 A	28-09-1989
		DE 8915915 U	09-04-1992
US 4030723 A	21-06-1977	CA 1051467 A	27-03-1979
		DE 2650438 A	16-06-1977
		FR 2335434 A	15-07-1977
		GB 1543197 A	28-03-1979
		JP 52075769 A	25-06-1977

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82